

What is MLOps?

MLOPS CONCEPTS

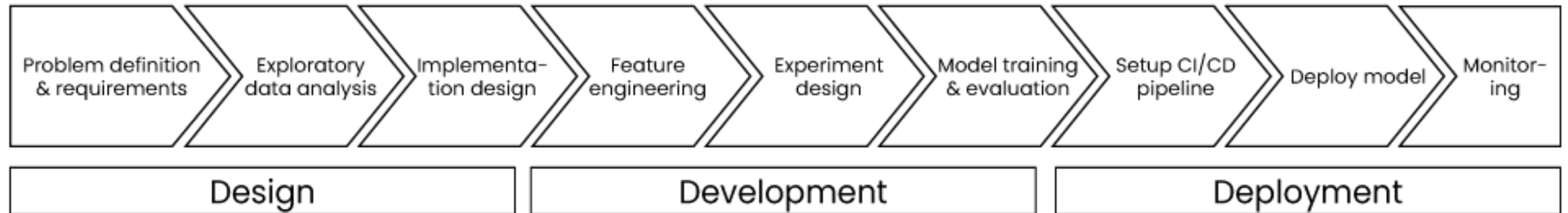


Folkert Stijnman
ML Engineer

Machine Learning Operations

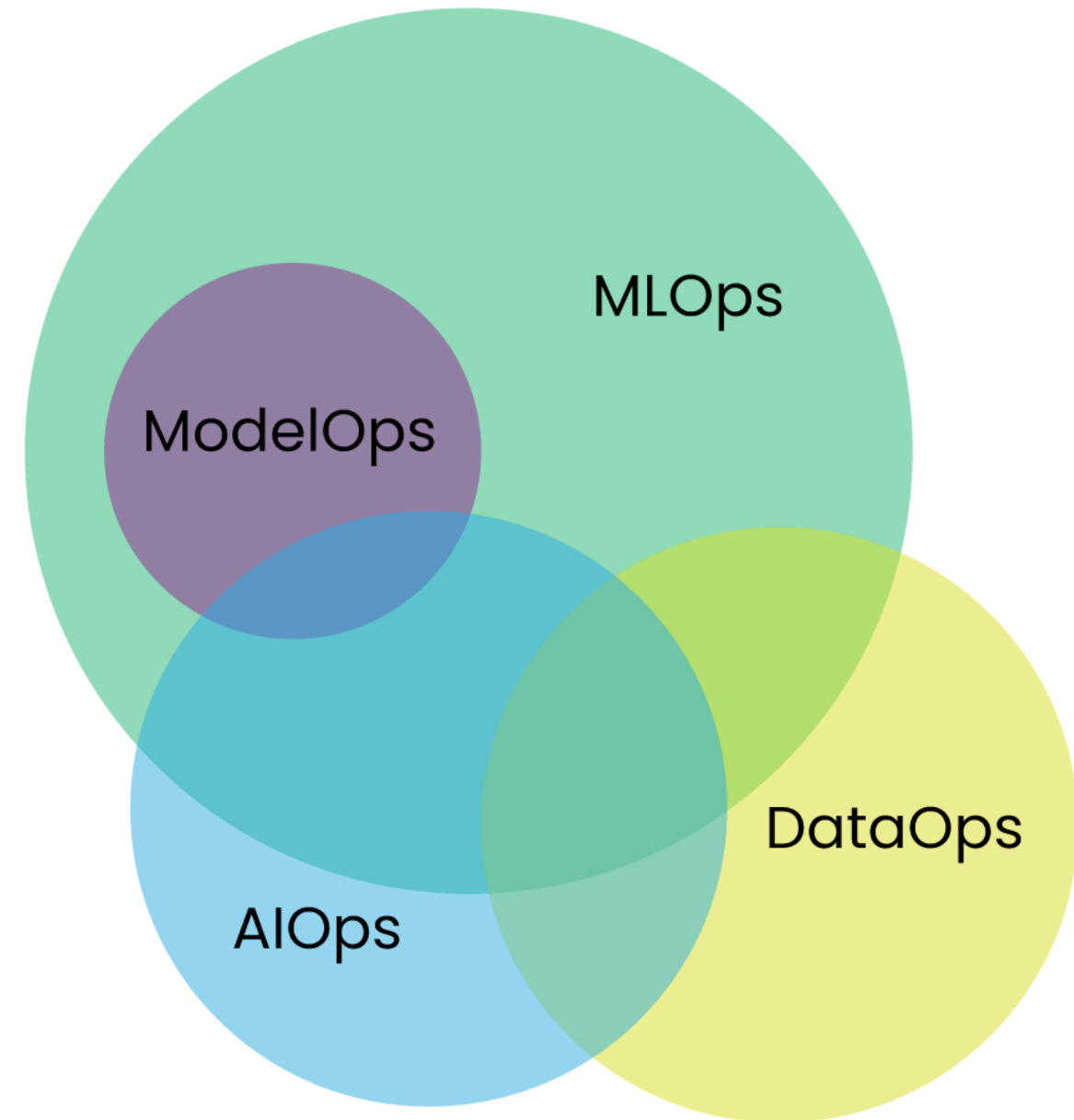
*...is the set of practices to **design, deploy and maintain** machine learning in production continuously, reliably, and efficiently.*

- Focus on machine learning '*in production*'
- The full machine learning lifecycle

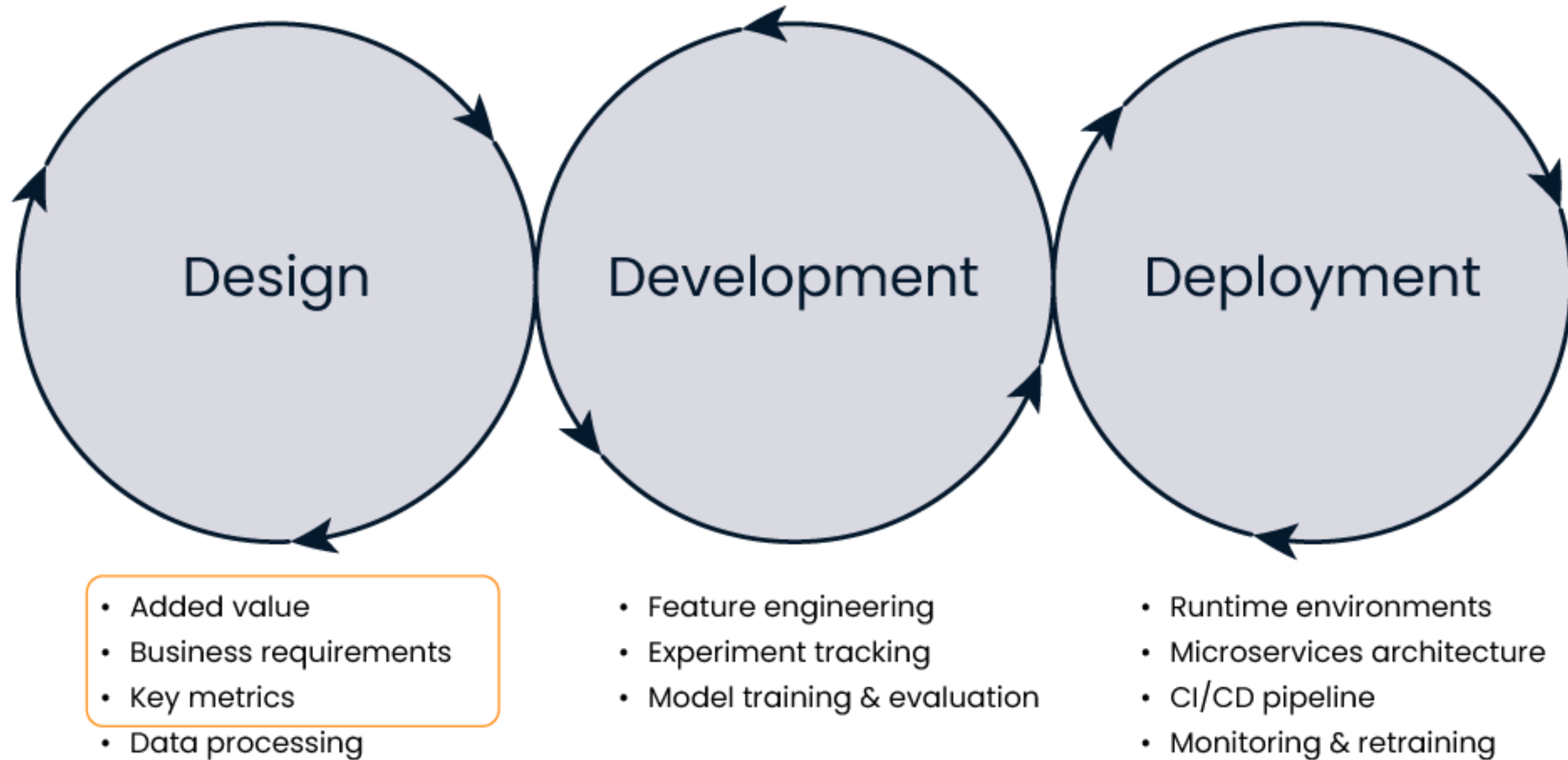


WhatOps?

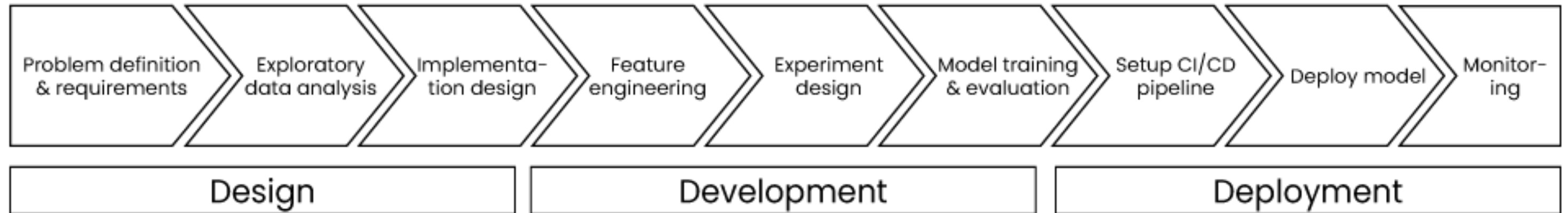
- **ModelOps:** Model Operations
 - Is primarily focused on the machine learning model
- **DataOps:** Data Operations
 - Focuses on best practices in data quality and analytics
- **AIOps:** Artificial Intelligence for IT Operations
 - Focuses on using analytics, big data, and machine learning to solve IT issues without human assistance or intervention



Machine learning design

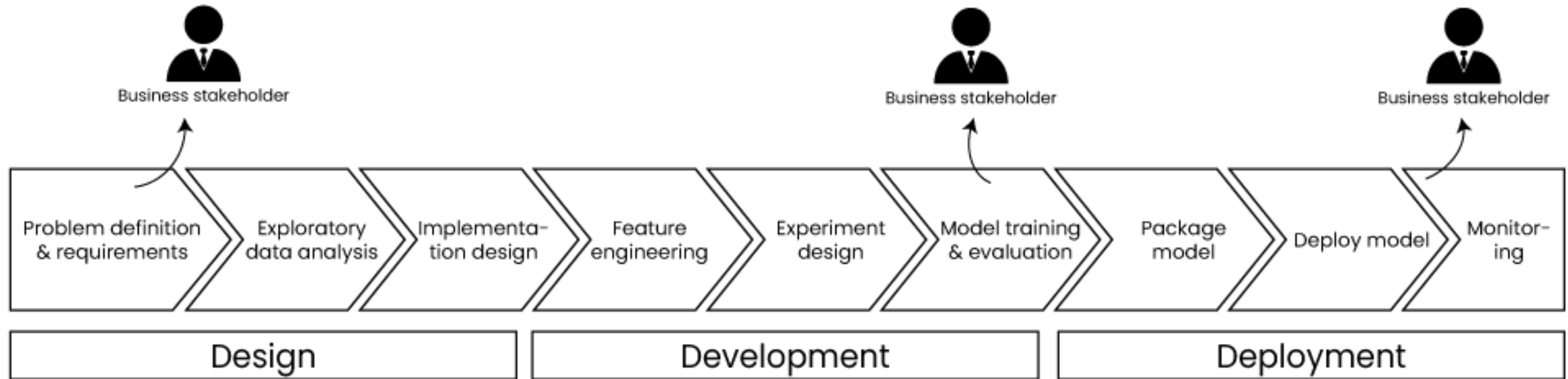


Machine learning lifecycle



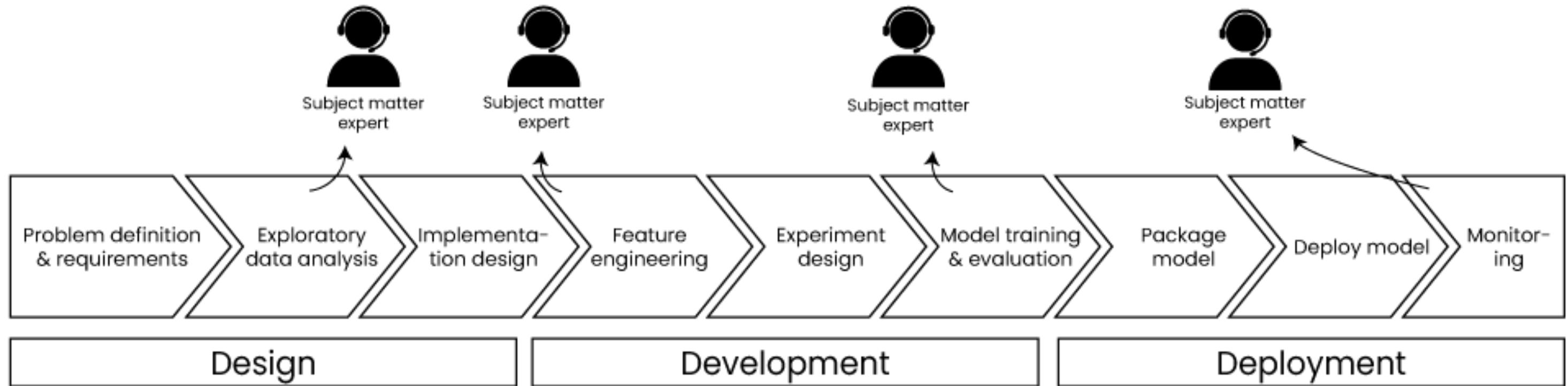
- Business roles
- Technical roles

Business roles: business stakeholder



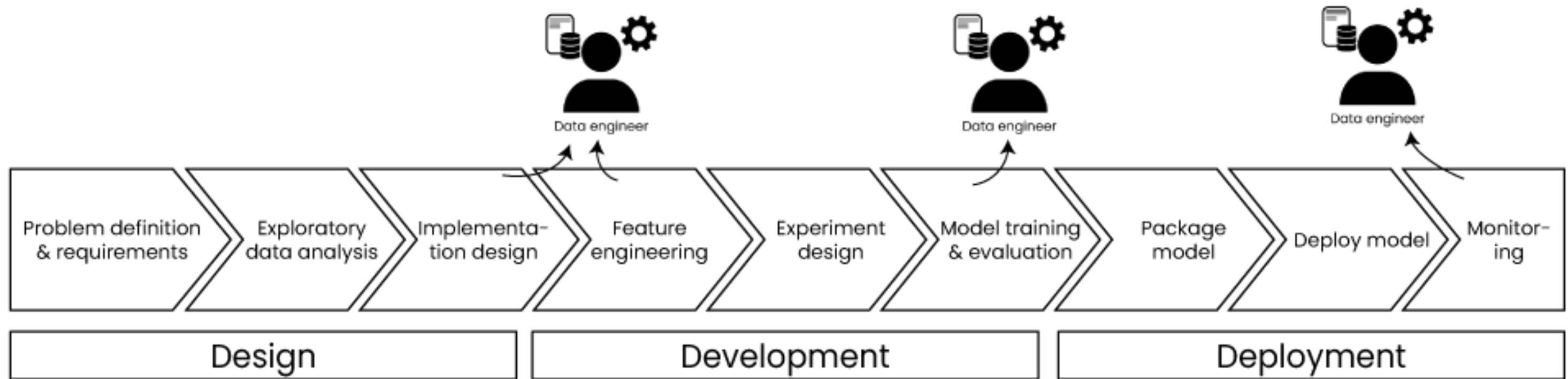
- Budget decisions
- Vision of company
- Involved throughout the lifecycle

Business roles: subject matter expert



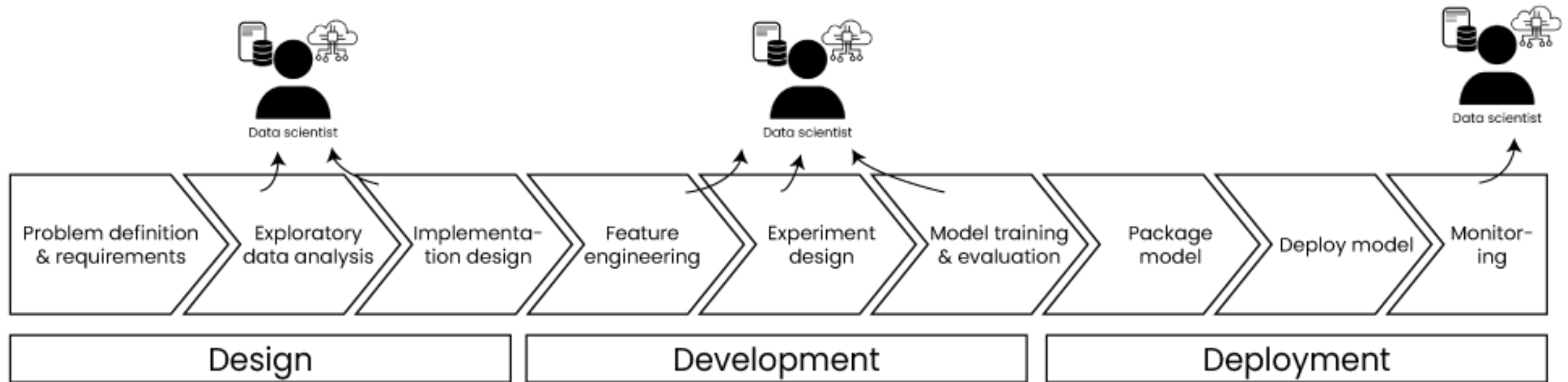
- Domain knowledge
- Involved throughout the lifecycle
- Interpret and validate data

Technical roles: data engineer



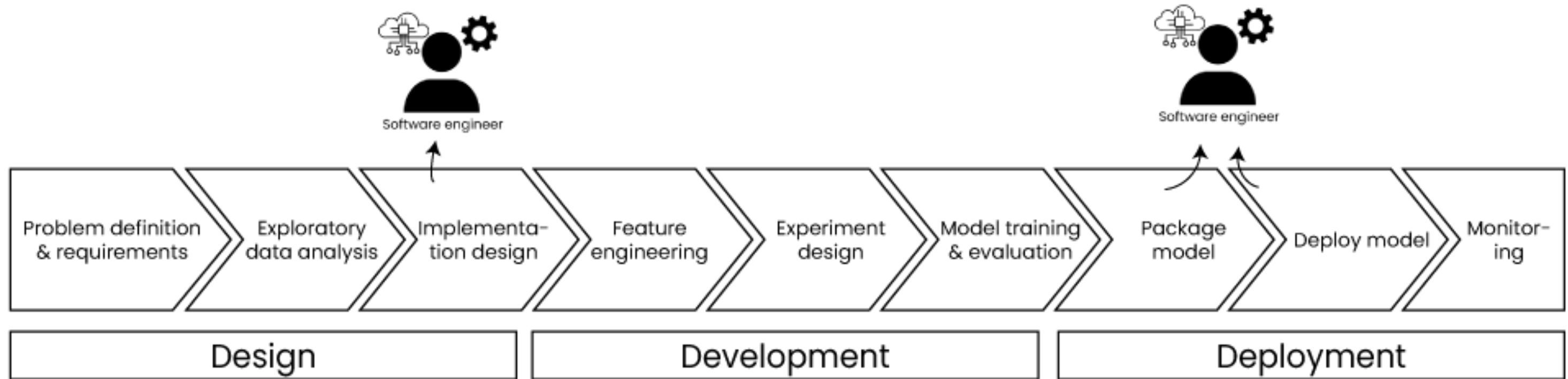
- Collecting, storing, and processing data
- Check and maintain data quality

Technical roles: data scientist



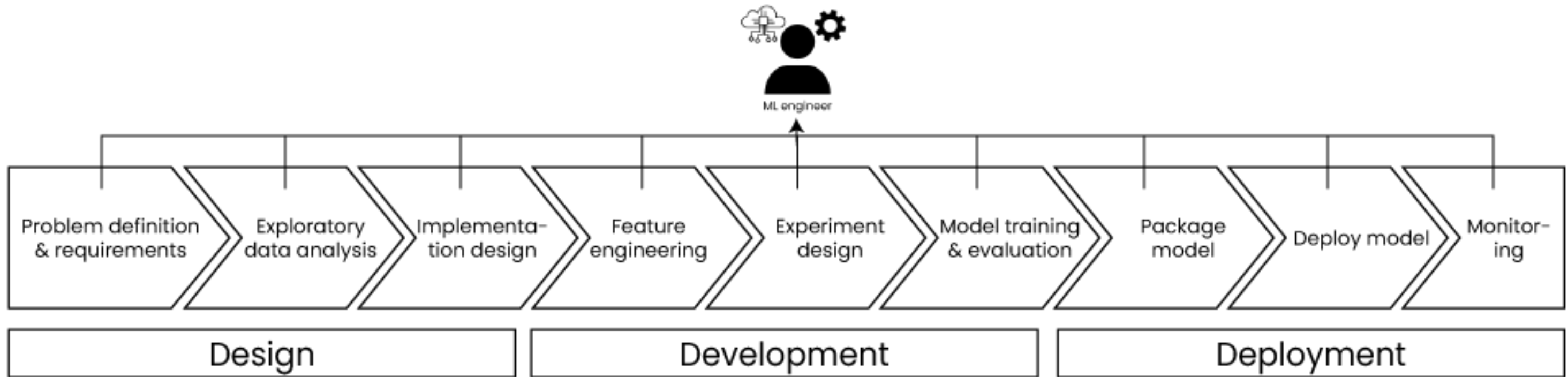
- Data analysis
- Model training and evaluation

Technical roles: software engineer



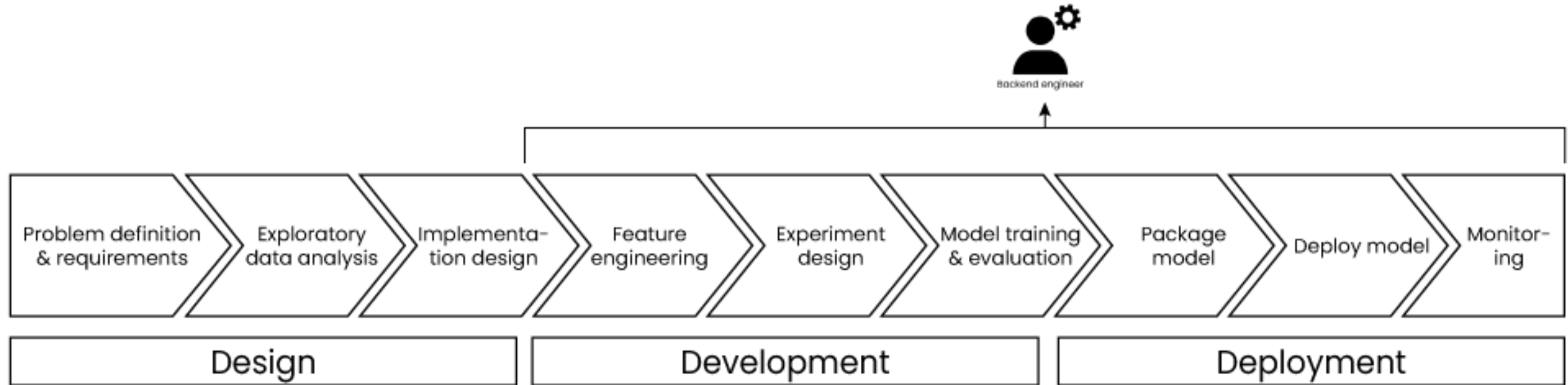
- Write software for model deployment
- Make sure that code follows guidelines

Technical roles: ML engineer



- Versatile role
- Specifically designed for complete machine learning lifecycle

Technical roles: backend engineer



- Enable development and deployment
- Cloud infrastructure

Technical Debt

the implied cost of additional rework caused by choosing an easy (limited) solution now instead of using a better approach that would take longer

~ *Wikipedia*[1]

Famous Google paper on the topic:

"Machine Learning: The high-interest credit card of technical debt"[2]

MORE TIME AND MODELS DEPLOYED

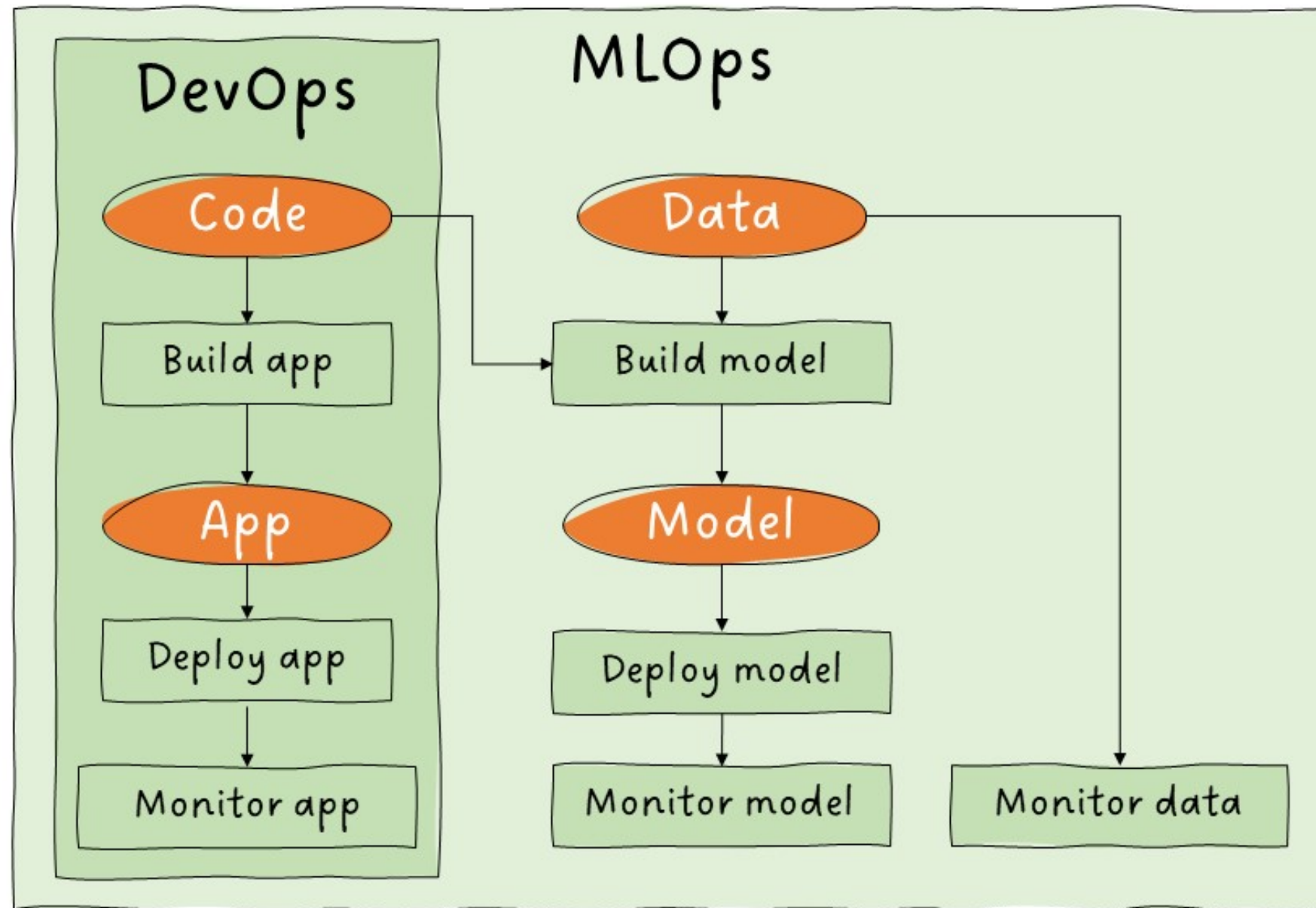
- More technical debt and model risk
- Process slower, more frustrating and error prone
- Ability to deliver value impaired

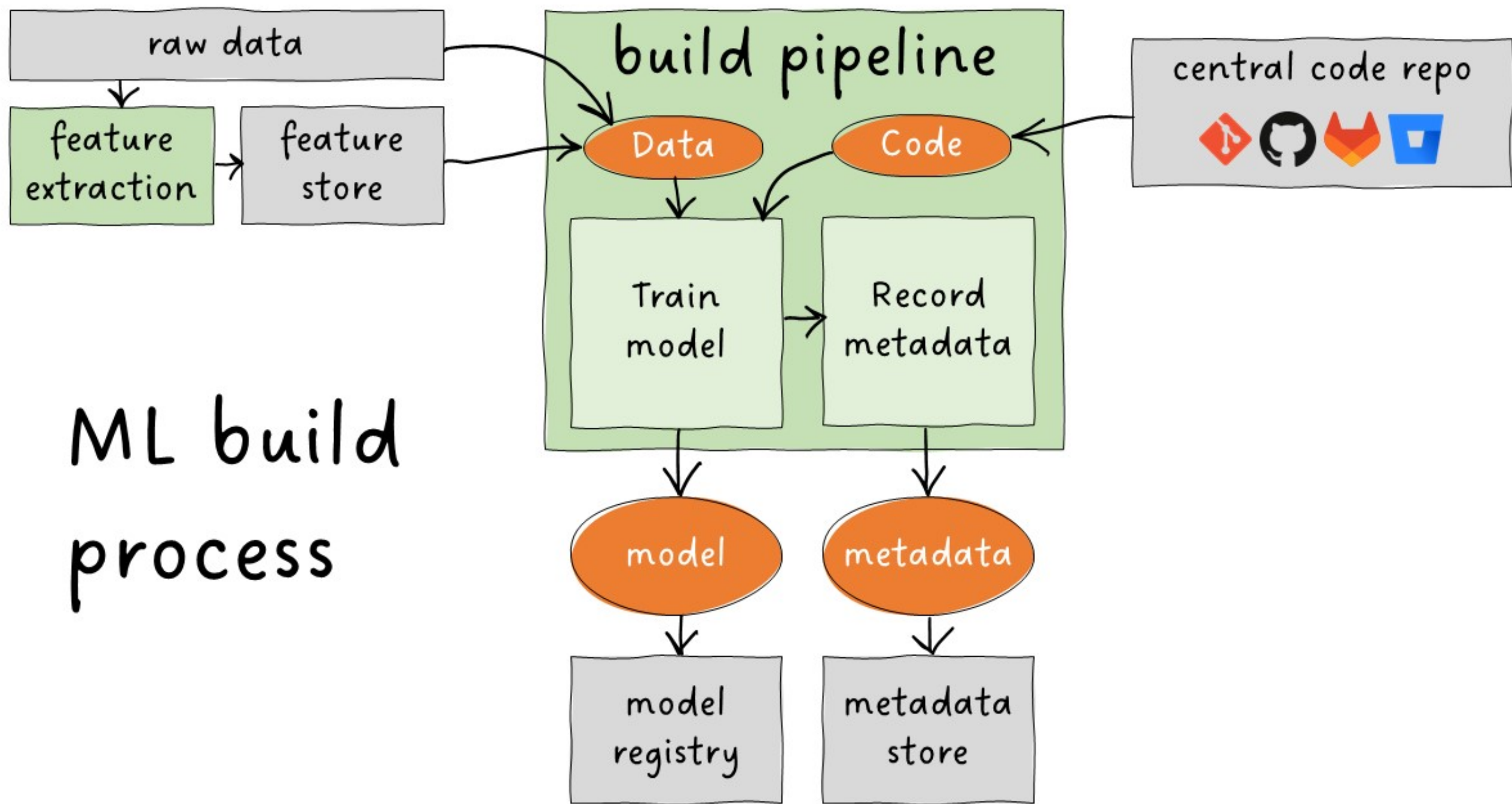
¹ https://en.wikipedia.org/wiki/Technical_debt ² <https://research.google/pubs/pub43146/>

ML workflows

- Data collection and preparation
- Data-labeling
- Model selection
- Model training
- Model packaging
- Model deployment
- Model monitoring and maintenance

ML workflow automation == MLOps maturity





ML build
process

